

2021 ACP Colorado Chapter Meeting

February 4, 2021 thru February 6, 2021

Broadmoor Hotel, Colorado Springs, Colorado



RESIDENT ABSTRACTS

PRESENTED:
FEBRUARY 4, 2021 THRU
FEBRUARY 6, 2021

Name: Rebecca Adams, MD **Presentation Type:** Oral Presentation

Residency Program: Saint Joseph Hospital

Additional Authors: Chris Bates MD, Norman Kwong PharmD

Abstract Title: Liquid Gold: Reducing the use/ordering of non-evidence-based intravenous albumin in the hospital setting

Abstract Information:

Introduction:

Prior to the onset of this quality improvement project, non-evidence-based administration of intravenous (IV) albumin at Saint Joseph Hospital was noted, anecdotally, to be higher than the national norm. Though it has been well-documented that crystalloid infusion is at least noninferior to colloid infusion for volume resuscitation in severe sepsis and septic shock.^{1,2} Additionally there is additional literature regarding poor benefit of IV albumin for hypoalbuminemia, even in the setting of anasarca/edema.⁴

Unfortunately, research supporting or refuting other indications and possible indications for IV albumin is weaker and less known in the local medical community. For example, in reference to the Stanford Health Care IV Albumin Administration guidelines⁶, there is little convincing literature surrounding administration of IV albumin in conjunction with diuresis for severe nephrotic syndrome, though this topic remains more controversial and individualized per the most recent guidelines.³

For this quality improvement project, the aim was to educate residents, attendings, and specialists alike on the current guidelines and literature surrounding IV albumin administration, summarized above. Where the literature was weaker (i.e. nephrotic syndrome, diuretic resistance), indication was individualized to the patient and consultation with nephrology was recommended for decision making. Only indications which have been researched well (see Figure 1) were considered “not-evidenced based” in this project.

Methods:

Prior to the intervention, a 3-month time period (January–March 2019), translating to 25,835 patient-days, was examined for IV albumin prescription. These prescriptions/administrations were then divided into evidence-based and non-evidence-based sections using the Stanford Criteria for Intravenous Albumin Administration and associated literature (Figure 1).

The intervention was performed during April 2019 via multidisciplinary meetings, resident education, and circulation of literature. The collection of data was then repeated for the time period of May-July 2019, translating to 25,782 patient days.

Results:

Following the intervention, there was a financially significant reduction in albumin prescription (Figure 2), saving the hospital \$18,000 in a 3 month period. This equates to a \$72,000 annual savings.

Discussion:

On a national level, there have been significant increases in healthcare spending both at the national and state/local level.⁵ The financial impact of non-evidenced-based practices can be staggering, as demonstrated in this quality improvement project, and can be a significant source of savings. Educational intervention is a very low-cost intervention that should be utilized whenever possible.

Name: Christopher Mowry, MD **Presentation Type:** Oral Presentation

Residency Program: University of Colorado

Additional Authors: Michelle Knees, DO

Abstract Title: Incidentalomas: When Three Clicks Adds Three Days

Abstract Information:

Introduction:

Introduction: Since the invention of CT scans in the 1970s, technology has become higher fidelity, faster, and cheaper. Coupled with medicolegal practices, which make physicians wary of missing even low-probability disease states, this has led to an increasing number of “incidentalomas” causing undue stress for both patients and providers. These findings are particularly difficult to address among those without decision-making capacity. With the rising prevalence of dementia worldwide, this will likely become an increasingly relevant topic and will require physicians to rethink ordering practices.

Case Description: A 90-year-old Spanish-speaking man with a history of dementia, partial deafness, and blindness presented with acute agitation. The patient had numerous concerns, including transient abdominal discomfort and throat soreness. Notably, his vital signs were normal, and a BMP, CBC, urinalysis, and chest x-ray were unremarkable. Physical exam demonstrated a distended but soft and nontender abdomen. He was unwilling to open his mouth but did not have trismus, drooling, or difficulty swallowing. The remainder of his exam was normal. A CT abdomen/pelvis was ordered, which found a mass consistent with lymphoma. Additionally, a CT neck was obtained and demonstrated a probable parotid neoplasm. The following morning, without intervention, the patient reported he no longer had throat soreness or abdominal pain. When presented with the imaging findings, he was unable to understand his probable malignancies. A capacity evaluation was performed with a translator and audio enhancer; the patient was deemed to lack capacity regarding further management of these masses. Unfortunately, his MDPOA could not be reached to guide further work-up, and guardianship was ultimately considered. Fortunately, his MDPOA was reached after several days, and the patient returned home without further intervention.

Discussion: This case illustrates the potential negative effects of low-value diagnostic imaging. This patient’s known dementia, sensory deficits, and language barriers were reasonable explanations for agitation in the setting of a negative altered mental status work-up with relatively normal vital signs, labs, and physical exam. This case exemplifies the need to defer low-value imaging unless there is a high pre-test probability for finding a relevant abnormality. These imaging studies were not cost-effective and led to emotional distress for the patient and his family. Moreover, they exposed him to unnecessary risks by prolonging his hospitalization. This case highlights the importance of several concepts when ordering diagnostic tests: 1) obtain a thorough history and apply this, in conjunction with objective findings from vitals, labs, and physical exam, to generate pre-test probabilities that may dissuade further testing, and 2) if a patient lacks decision-making capacity, attempt to contact surrogate decision makers prior to obtaining non-emergent tests.

2021 ACP Colorado Chapter Meeting – February 4, 2021 thru February 6, 2021– Virtual Meeting

Name: Neil Patel, MD

Presentation Type: Oral Presentation

Residency Program: Parkview Medical Center

Additional Authors: Logan Reimer, MD, Douglas Duffee, MD, Mdiv, FACP

Abstract Title: Electrical Manifestation of Malignancy: carcinoid heart causing cavo-tricuspid atrial flutter

Abstract Information:

Carcinoid heart disease occurs in up to 50% of carcinoid syndrome patients and is characterized by a fibrous plaque-like deposition, typically on the right side of the heart most commonly causing tricuspid regurgitation and pulmonic stenosis¹. In some cases, these valvular anatomical changes are accelerated by unusually high levels of plasma serotonin and subsequently its urinary metabolite 5-HIAA² and while uncommon, can produce a nidus for cavo-tricuspid atrial flutter³. We present a single case, a 66-year-old male with a biopsy proven history of metastatic gastrointestinal carcinoid tumor who presented to the ER with acute onset of palpitations after declining somatostatin analogue therapy 2 years prior at the time of initial diagnosis. At initial presentation, the patient had a NT-Pro-B-Type Natriuretic peptide of 1750 pg/mL and a urinary 5-HIAA level of 213.8 mg/24hr. Echocardiography was performed which was unremarkable for valvular disease and a liver biopsy was remarkable for tumor cells staining with antibodies to CDX-2, confirming the diagnosis. Current presenting symptoms of palpitations and dyspnea were now associated with an ECG showing typical cavotricuspid atrial flutter with a rapid ventricular response and an elevated Chromogranin A level at 429 nmol/L. The atrial flutter was treated medically with diltiazem to obtain rate control and with anticoagulation for stroke prevention. Echocardiography confirmed interval development of carcinoid heart disease showing thickened tricuspid leaflets resulting in immobile leaflets and severe regurgitation, a moderately dilated right ventricle, diastolic flattening of the ventricular septum, and a severely dilated right atrium and inferior vena cava. Cardiology consultation was obtained and in preparation for definitive cardiac treatment, cardiac catheterization was performed which showed a 70% LAD occlusion. Subsequently, the patient underwent tricuspid and pulmonic valve replacement, left and right MAZE with atricure, left atrial appendage closure with atriclip, and a LIMA to LAD CABG. The patient was agreeable to resume monthly lanreotide injections.

Residency Program: University of Colorado

Additional Authors: Christine Sailer, MD, Amber Khanna, MD

Abstract Title: A Case Report of a STEMI with Severe Hyponatremia: An Illustration of Increased Cardiac Morbidity During the COVID-19 Pandemic

Abstract Information:

One third of the 20% excess mortality in the USA during the COVID-19 pandemic from March to July was not related to coronavirus infections, but rather, due to other medical conditions. Worsened outcomes have been related to delays or reductions in healthcare access for those diseases, especially among minorities. Deferment of non-urgent cardiac stress testing was particularly prevalent early in the pandemic. In patients with atypical symptoms of coronary disease, lower clinical suspicion may further reduce stress testing. Patient avoidance of medical care for perceived non-emergencies has likely contributed to late presentation of ST-elevation myocardial infarctions and increased complications.

Case Description: A 62 year old Hispanic woman with a history of hypertension, diabetes, and stroke was brought to the ED by her son with two days of headache, vomiting, and progressive confusion. She had experienced chest and back “bloating”-like discomfort for the preceding two days. Two weeks earlier, she had presented to the ED 3 separate times and had experienced similar discomfort, beginning when she ran out of her anti-hypertensive medications. On the 3rd ED visit, her HEART score was 4, but stress testing was not done. She then attempted controlling her hypertension by eating only fruits and vegetables.

On presentation, she had sinus tachycardia to 100s and was normotensive. Her extremities were cool, and no jugular venous distention or edema were present. The patient was altered, requiring intubation for airway protection. Her labs were notable for:

- Na 120, Cl 89, HCO₃ 19, AG 12. Lactate 1.4.
- Serum Osm 257, urine Osm 622, urine Na 14
- Troponin 20.18 ng/mL
- BNP 1141

EKG demonstrated anterolateral ST elevations. The patient was emergently taken to the catheterization laboratory for STEMI, where a 100% proximal LAD occlusion with thrombus was found. One drug-eluting stent was placed. Troponin peaked at 298.40 ng/mL. TTE demonstrated EF 20.7% with severe hypokinesis to akinesis of the anterior, anterolateral, inferolateral, and inferior walls as well as the mid to apical septum. Over the next 3 days, her mental status improved as her hyponatremia corrected with fluids.

Discussion: In the early phase of the pandemic, this patient had atypical cardiac symptoms and did not undergo cardiac stress testing. She tried managing her symptoms and hypertension through strict dietary restriction, causing symptomatic severe hypovolemic hyponatremia. She ultimately presented 2 days after onset of progressive atypical chest pain and confusion and was found to have a STEMI, resulting in severe HFrEF. Though typically due to neurohumoral activation and not hypovolemia, sodium under 130 develops in 4.3% of patients with STEMI and correlates with worsened prognosis. The degree and etiology of this patient’s hyponatremia is particularly

uncommon. This case illustrates the consequences of deferring non-urgent medical care during the pandemic, counterbalancing infection control.

2021 ACP Colorado Chapter Meeting – February 4, 2021 thru February 6, 2021– Virtual Meeting

Name: David Baldwin, DO

Presentation Type: Poster Presentation

Residency Program: Saint Joseph Hospital

Additional Authors: Rohindeep Singh, DO, Cuong Doan, MD, FACP

Abstract Title: SIADH vs CSW

Abstract Information:

Introduction: Crowned dens syndrome (CDS) is a rare cause of neck pain due to calcium pyrophosphate crystal deposition (CPPD) along the atlanto-axial articulation. The syndrome occurs most commonly in older patients and classically presents with acute to subacute neck pain, rigidity, and fever. Inflammatory markers are often elevated and diagnosis is made by characteristic computed tomography (CT) findings of calcium deposition around the transverse ligament of the atlas. In most cases, pain responds well to non-steroidal anti-inflammatory drugs (NSAIDs), colchicine, or steroids.

Case Report: A 76-year-old woman presented with one week of neck pain and fevers. Past medical history was significant for chronic kidney disease (CKD) and chronic hypomagnesemia. On exam, she was febrile to 38.4 degrees Celsius with pulse of 110 beats per minute and blood pressure of 130/80 mmHg. She was tender along the left trapezius muscle, with full active and passive range of motion of the neck, no nuchal rigidity, and a non-focal neurologic exam. Labs were notable for a white blood cell count of 17.5 k/uL and lactate of 1.2 mmol/L. Erythrocyte sedimentation rate (ESR) was significantly elevated at >80 mm/h and C-reactive protein (CRP) was 96.1 mg/L. Empiric antibiotics for meningitis were initiated. Computed tomography (CT) of the head was unremarkable and lumbar puncture revealed clear cerebrospinal fluid with protein of 40 mg/dL, 0 white blood cells, 0 red blood cells, and no xanthochromia. Closer review of a CT of the neck revealed calcium pyrophosphate deposition along the atlanto-axial joint, specifically the dens, diagnosing crowned dens syndrome. Antibiotics were discontinued and prednisone was initiated with prompt resolution of her neck pain.

Discussion: It is important to consider and recognize CDS, given the significantly different management compared to other entities that present similarly including meningitis and temporal arteritis.

While still relatively rare, the presence of CDS may be underrecognized. A recent retrospective study at the University of Kansas noted 60% of patients with known or probable CPPD that had undergone imaging had findings consistent with CDS. Furthermore, CDS has a higher predominance in older individuals, with a median age of onset around 71.4. Particularly notable is that incidence of chondrocalcinosis increases with age, reaching 50% by the age of 80. Many cases remain asymptomatic.

Our patient had additional risk factors for CPPD, which in turn, increase her risk of CDS. CPPD has been associated with CKD and disorders of magnesium. Hypomagnesemia specifically may lead to excess extracellular concentrations of inorganic phosphates and subsequent crystal formation, as magnesium is a cofactor for alkaline phosphatase, which otherwise maintains phosphorus homeostasis.

Treatment of CDS with steroids, NSAIDs, or colchicine should invoke rapid resolution of symptoms, as seen in our patient. Nephrology continues to manage her CKD and hypomagnesemia.

2021 ACP Colorado Chapter Meeting – February 4, 2021 thru February 6, 2021– Virtual Meeting

Name: Cameron Barber, DO

Presentation Type: Poster Presentation

Residency Program: Parkview Medical Center

Additional Authors: Elise Ewens, OSM III, Anne George, OSM III, Kourtney Aylor-Lee, DO

Abstract Title: Shortness of breath, it's not always in the chest

Abstract Information:

Introduction:

79 million Americans are infected with HPV according to the CDC. Between 2012 and 2016, an average of 43,999 cases of HPV-associated cancer were reported. Our case depicts the possible deleterious effects of HPV and serves as a springboard for discussion of the impact of the HPV vaccine.

Case presentation:

A 72-year-old male with medical history of COPD, CHF/EF, significant tobacco use history, and a recovered alcoholic presented with progressive dyspnea for several weeks. The patient was found to be hypoxemic upon admission with significant metabolic alkalosis with respiratory compensation. Treatment was initiated for acute on chronic hypoxemic/hypercapnic respiratory failure. However, during hospitalization a roughly 4 cm x 4 cm R sided neck mass was found on physical exam. Subsequent imaging showed extensive centrally necrotic infiltrating malignancy extending from the base of the tongue through the epiglottis, hypopharynx, and larynx highly suspicious for squamous cell carcinoma. Further workup confirmed T4, N2B squamous cell carcinoma with bilateral cervical metastatic adenopathy. Patient was also found to be positive for HPV. Our patient underwent tracheostomy, PEG tube placement, and Q port placement while in the hospital with plans for a radical debulking procedure at a tertiary facility, followed by radiation therapy.

Discussion:

This patient had multiple risk factors for squamous cell carcinoma: a former alcoholic, an extensive smoking history, and HPV positive. While all of these are currently preventable, for this patient the HPV vaccination was not possible due to his age and the relatively recent release of the HPV vaccine in 2006. While the cause of this patient's cancer is multifactorial, the burden of disease demonstrated in this case showcases the importance of the HPV vaccine in potentially preventing future cases like this. According to the National Program of Cancer Registries data in 2012-2016, oropharyngeal cancer was found to be the most common type of cancer attributed to the HPV types contained within the vaccine in all states except Texas. This means that HPV vaccination has the highest potential to decrease incidence of oropharyngeal cancer over other HPV related cancers, which would have been a great benefit to our patient if this had been an option for him.

As patient healthcare advocates, one of our primary goals as physicians is to be champions of prevention, which include modifying risk factors through lifestyle changes, screenings, and vaccinations. Promoting this vaccine is especially important as it has been challenged repeatedly by the public and surrounded by stigma. In 2018, a report by the National Immunization Survey-Teen showed that "just 51% of all teens had received all recommended doses of the HPV vaccine." This case illustrates just one of the many devastating outcomes that could be prevented with this vaccine.

Name: Rahul Bhaskar, MD

Presentation Type: Poster Presentation

Residency Program: Parkview Medical Center

Additional Authors: Chase Bartholomew, DO, Jessica Nash, DO, Joseph Beier, MD, DaYoung Kim, OMS III, Kiely Schultz, DO

Abstract Title: ACUTE LUMBAR OSTEOMYELITIS/DISCIITS PARADING AS LEG CRAMPS

Abstract Information:

Vertebral osteomyelitis is a spinal infection whose major presenting symptom is back or neck pain and which, if left untreated, can result in bone destruction, spinal cord compression and severe radiculopathy with loss of function of regions supplied by affected nerves¹.

A 65-year-old female with rheumatoid arthritis and spinal stenosis on hydroxychloroquine, adalimumab and methotrexate was brought to the ED from urgent care for lower extremity spasms. Per EMS records, she had a fever of 101.0 F at the urgent care however upon EMS' check, her temperature was 99.0 F. She remained afebrile at the hospital with no other evidence of infection on vitals or labs. In the ED, patient was noted to have bilateral lower extremity cramping and pain. She reported an epidural steroid injection by her pain management doctor the day before. Initial labs included an elevated creatine kinase at 524, however her other labs were grossly normal. The patient was unable to sit still for an MRI given her severe cramping and spasms so she was admitted for control of these symptoms. She denied back pain, point tenderness and there was no erythema or edema at the injection site. Pain was managed with patient's preexisting intrathecal pain pump, and baclofen. Venous dopplers were negative for DVT in her lower extremities. Notable labs on hospital day two included a hypokalemia of 2.7, a leukocytosis of 14 and a creatine kinase that trended up to 1353. In the absence of signs of infection, her labs were suspected to be reactive to physiologic stress. After correction of her hypokalemia she reported feeling better with significantly improved pain. She was able to lay still for a MRI, which revealed extensive fluid signal at L5-S1 disc space and marrow signal changes involving L5 and S1 vertebral bodies. Disc fluid was noted to extend into the presacral space with associated paraspinal edema and enhancement. Neurosurgery deemed she needed urgent surgical intervention for debridement of the area given the bone destruction already present. Post-operatively she was monitored in the ICU and started on IV Vancomycin empirically. Bacterial, fungal, and AFB cultures were obtained from surgical specimen, which returned negative for any growth as did blood cultures obtained on day of diagnosis. She was discharged to inpatient rehabilitation for physical therapy and to continue antibiotics for an additional 10-14 days.

This case illustrates the high-index of suspicion necessary for infection in patients on multiple immunosuppressants. The patient did not have leukocytosis, fever or any infectious

symptoms on arrival. Additionally, her ESR and CRP were not elevated. This case also highlights the need to suspect atypical presentations for infection in these patients. Luckily, this patient had a good outcome after a short stay at inpatient rehab.

Reference:

McDonald, M., & Peel, T. (2020, July 13). *Vertebral osteomyelitis and discitis in adults*. UpToDate. https://www.uptodate.com/contents/vertebral-osteomyelitis-and-discitis-in-adults?search=vertebral%20ostemyelitis&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1#H32

Name: Mindy Chen, MD

Presentation Type: Poster Presentation

Residency Program: University of Colorado Medical School

Additional Authors: Diana Mancini, MD

Abstract Title: Niacin induced acute liver failure in the setting of energy drink consumption: a case report

Abstract Information:

A previously healthy 40 year old woman was brought in by ambulance after her father noted her to have progressive somnolence and confusion. Her medication list included methadone, iron supplements, omeprazole, gabapentin, and venlafaxine. At the time of presentation she had not taken her medications for 2 days. She did not have any drug or alcohol use. The only supplementation family noted was an occasional sports drink she kept at the bedside. On presentation she was awake but not able to follow commands and her speech was unintelligible. She was found to have elevated LFTs with an AST of >5400 and ALT >3300. INR was 2.16. She met Kings Criterion for acute liver failure and was admitted to the medical intensive care unit. She was started on N-acetyl cysteine despite an acetaminophen level of <2.0. Unfortunately, due to her weight and high opioid requirement at baseline, she was not considered a liver transplant candidate. Given her unclear presentation, an extensive workup for the cause of liver failure was conducted including infectious, perfusion, autoimmune, and toxic. All testing was negative except for an elevated niacin level. Her mental status and labs continued to improve over the next several days, and she was discharged on hospital day 10.

Discussion:

Drug induced liver injury accounts for almost 50% cases of all liver failure in the United States. However, an often overlooked cause of liver failure is dietary supplementation. Energy drinks are classified as dietary supplements or foods, which have little oversight and control by the FDA. Energy drinks, unlike traditional caffeinated beverages, contain herbal blends, taurine, glucuronolactone, and vitamins in high concentrations. The average sports drink contains between 24 to 47 mg of niacin per can. The recommended dietary allowance of the vitamin is between 14 and 16 mg daily for adults. Niacin is a water soluble vitamin which can be used to lower LDL cholesterol and raise HDL cholesterol. However, it has been associated with liver toxicity. Case reports have shown high doses of niacin leading to hepatocellular hepatitis as well as acute liver failure. The niacin serum levels overwhelm the high affinity and low concentration of nicotinic acid receptors. Instances of niacin leading to acute liver injury and even failure have been noted in athletes taking niacin to enhance muscle regeneration. It has also been noted in those who take it as a way to hide the evidence of illicit drugs to pass a urine drug screen. Energy drinks are often thought of as benign and are consumed in excess, especially by a young population. While not the most common cause of liver injury, education on the potential risks should be emphasized for at risk groups.

Name: Jennifer Doran, MD

Presentation Type: Poster Presentation

Residency Program: University of Colorado

Additional Authors: Natalie Longino, Lakshmipriya Karamsetty, Jeffrey Spence, Noelle Northcutt

Abstract Title: Scrotal Swelling in Adults, an Indication of IgA Vasculitis

Abstract Information:

IgA vasculitis, formally known as Henoch-Schönlein Purpura (HSP), is the most common form of systemic vasculitis in children (3-26.7 of 100,000 persons per year) and typically has an excellent prognosis. Typical characteristics include non-thrombocytopenic palpable purpura, abdominal pain, and arthritis. IgA vasculitis is far more rare in adults (0.8-1.8 of 100,000 persons per year) and this can lead to unrecognizable presentations of typical and atypical characteristics as seen in our case. .

Case Description:

A 46-year-old Caucasian man with history of current intravenous (IV) drug use presented to the Emergency Department with 12-hour onset of scrotal swelling, redness, and pain. He also endorsed 3-day history of mildly pruritic, non-painful rash of his thighs, buttocks, and trunk. He denied fever, abdominal pain, hematuria, or dysuria. He used heroin the day of presentation and injected into his right upper thigh. On examination he was afebrile, hemodynamically stable, and had a diffuse purpuric, non-blanching rash of his lower extremities that was more pronounced posteriorly. His anterior scrotum was edematous, erythematous and indurated with no apparent fluctuance. The scrotal pain worsened with testicular elevation and palpation. Initial laboratory findings included normal white blood cell and platelet count, C-reactive protein 91 mg/L, erythrocyte sedimentation rate >80 mm/hr, D-dimer 6.83 mcg/mL, urinalysis with 3+ protein, and urine protein to creatinine ratio of 1.39. A 24-hour urine protein collection had 4284 mg. Scrotal ultrasound demonstrated enlarged heterogenous appearance of the left epididymis with hyperemia and bilateral scrotal wall thickening with no signs of torsion, varicocele, or hernia. He was started on IV antibiotics for concerns of scrotal cellulitis and epididymo-orchitis. In addition, a skin and renal biopsy were obtained given his extensive rash and nephrotic range proteinuria concerning for a systemic process. By hospital day 3, the scrotal edema, erythema, and pain had completely resolved and antibiotics were discontinued the following day. Biopsy results showed IgA vasculitis with associated focal proliferative glomerulonephritis. The patient was discharged with outpatient follow up to monitor renal function and discuss ongoing management

Discussion:

While scrotal manifestations including epididymitis, orchitis, and spermatic cord involvement are reported in about one fifth of children with IgA vasculitis, very few reports have described scrotal involvement in adults. Given this uncommon presentation, there is high risk for misdiagnosis and diagnostic complications including unnecessary surgical exploration. In our

case, the clinical picture was further complicated by ongoing IV drug use, raising the concern for an infectious etiology of scrotal findings. However, the purpuric rash combined with nephrotic-range proteinuria described a systemic process prompting a biopsy that ultimately revealed the diagnosis. IgA vasculitis should therefore be on the differential for adults presenting with scrotal swelling and rash so that an early diagnosis via biopsy can prevent unnecessary interventions.

Name: Viridiana Estrada, MD
Presentation

Presentation Type: Poster

Residency Program: University of Colorado

Additional Authors: Isabel Z. Fernandez, PhD, Amanda V. Johnson, MD, Samuel Carpentier, MD, PhD, Jason John, MD, Kellie Hawkins, MD, MPH

Abstract Title: Triple Threat: A case of Bubonic, Septicemic, and Pneumonic Plague Through Feline Transmission

Abstract Information:

Introduction:

Social history is a required but often neglected portion of a patient's history. We present a case of a 60-year-old male who presented with gastrointestinal complaints and was ultimately found to have a mass that routine preventative screening may have prevented.

Case Description:

Patient is a 60-year-old male with past medical history of type 2 diabetes and anxiety presented to the emergency department with complaints of intractable nausea with episodes of vomiting and diarrhea. He also reported chronic diabetic foot ulcers and unintentional weight loss of approximately 40lbs over the last year. Social history on admission included past smoking history, occasional alcohol use, and no marijuana or illicit drug use. Physical exam revealed a thin, anxious man with epigastric tenderness and left supraclavicular lymphadenopathy. A CT abdomen/pelvis revealed a 4.8x7.5x4cm pancreatic mass as well as retroperitoneal lymphadenopathy. The patient had a family history of pancreatic adenocarcinoma in his mother and, knowing the grim prognosis of pancreatic adenocarcinoma, he was unsure if he would want treatment. He underwent an endoscopic biopsy of the pancreatic parenchymal mass. Pathology revealed diffuse large B-cell lymphoma (DLBCL). As DLBCL is an AIDS defining illness, a more thorough sexual history was discussed; the patient reported having unprotected sex with both men and women at least 10 years prior to presentation. Review of outpatient records showed that HIV testing had been ordered more than two years prior but the patient had never had the testing done. During this hospital stay, HIV testing was completed and found to be positive with a CD4 count of 119. Testing for hepatitis B and C were negative but syphilis was positive. The patient was started on antiretroviral therapy and chemotherapy. Unfortunately, the patient passed away approximately one month after diagnosis and initiation of treatment.

Discussion:

The risk of developing non-Hodgkin lymphoma, including DLBCL, is increased with HIV. It is one of the AIDS defining malignancies along with Kaposi sarcoma and cervical cancer^{1,2}. Diffuse large B-cell lymphoma has a good prognosis but the mortality increases with the degree of immunosuppression from AIDS². Recommendations for screening of HIV and other sexually transmitted infections in patients with high-risk sexual behaviors should be done but does not delineate the frequency with which repeat screening should be done³. Our patient had a distant history of high-risk sexual activity but his medical chart only indicated that he

was not sexually active. Screening was not done (even when ordered years prior) as the patient did not feel it was necessary. A more robust social history may have led to further discussion of the recommended screening and earlier treatment that may have prevented development of an AIDS defining malignancy.

Name: Maksim Grachev, DO

Presentation Type: Poster Presentation

Residency Program: Parkview Medical Center

Additional Authors: Cameron Barber, DO, Douglas Duffee, MD, FACP, Hardik Doshi, MD

Abstract Title: Severe Lower Extremity Weakness in Amiodarone Induced Thyrotoxicosis.

Abstract Information:

Introduction:

Yersinia pestis is a gram-negative bacterium that causes plague and is primarily transmitted to humans through flea bites or animal exposure. It can present with three main clinical forms: bubonic, septicemic, and pneumonic plague. Infection with *Y. pestis* can cause a severe and rapidly progressing disease that can be lethal in the absence of treatment.

Case Description:

The patient is a 37-year-old previously healthy male who experienced fevers and nausea two days after cutaneous and respiratory secretion exposure to an infected cat in rural Colorado. He began treatment with azithromycin for presumed *Bartonella* versus *Francisella* infection. Two days after antibiotics, he continued having high fevers and new painful axillary swelling, at which time he was admitted to the hospital. Gentamicin was added after a lymph node biopsy. He subsequently developed progressive encephalopathy, respiratory failure requiring intubation, and pressors for septic shock. CT chest was notable for multifocal pneumonia. Admission blood cultures and lymph node biopsy were ultimately confirmed as *Y. pestis* by the state laboratory. Levofloxacin was added and the patient clinically improved with extubation two days later. The patient was discharged on oral levofloxacin and doxycycline after a thirteen-day stay. He presented to the hospital several days later with high-grade fevers, worsening left upper extremity swelling, and was found to have a left brachiocephalic vein deep vein thrombosis. His course of doxycycline was extended given concern for thrombophlebitis and he was initiated on anticoagulation. The patient continues to follow with Infectious Disease as an outpatient to ensure full resolution of symptoms and laboratory abnormalities.

Discussion:

There are several notable features of this case, including the exposure from feline host, delayed directed antibiotic coverage, and the complex clinical course. There have been several cases of feline transmission over the last few decades in the US; these represent a fairly large proportion given its low incidence. Interestingly, most of the primary pneumonic plague exposures in the US have been associated with exposure to feline respiratory secretions.

While our patient had possible respiratory exposure to a feline from an endemic area, his

clinical course correlates most closely with either bubonic or septicemic plague as primary with progression to secondary pneumonic plague. Initial antibiotic coverage was targeted towards common zoonotic diseases. This may have unfortunately permitted bacterial dissemination and resulted in multiple complications. These rarer presentations of plague present with higher mortality than bubonic plague and in the case of pneumonic presentation can facilitate human-to-human transmission.

Our report highlights the importance of high clinical suspicion and prompt antibiotic coverage for *Yersinia pestis* in endemic areas for patients with concerning presentations.

Name: Willian Grigg, DO

Presentation Type: Poster Presentation

Residency Program: Parkview Medical Center

Additional Authors: Neil Patel, MD, Rajiv Singh, MD, Teresa Braden, DO, FACP, Bhavani Suryadevara, MD

Abstract Title: The tale of a man with a Broken Heart

Abstract Information:

Introduction:

ST elevation myocardial infarction (STEMI) is characterized by greater than 1 mm ST elevations from the J-point, cardiac enzyme elevation and is usually associated with chest pain. Upon recognition of STEMI, treatment is reperfusion with thrombolytics or primary percutaneous intervention.

This case highlights how a 71-year-old male presented to the hospital via EMS with ST elevations in leads V2, V3, and V4, crushing substernal chest pain and elevated high-sensitivity troponins. He

underwent left heart catheterization and was found to have no angiographic evidence of ischemia. LV ventriculogram during left heart catheterization demonstrated severe LV dysfunction with an estimated ejection fraction of 25% and akinesis of the apical and basilar walls. A significant gradient upon pullback was also noted. Given these angiographic findings and the near global hypokinesis noted on echocardiogram with associated LVOT (LV outflow tract obstruction) gradient of 52 mmHg led to the diagnosis of Takotsubo cardiomyopathy.

While ST segment elevation is frequent in stress-induced cardiomyopathy it is unusual for men to be diagnosed with this condition. In the International Takotsubo Registry (a consortium of 26 centers in Europe and the United States) of 1750 patients with stress induced cardiomyopathy, 89.9 percent were women with a mean age of 66.4 years. Also, what makes this case unique is the LVOT obstruction which has been documented in some patients but is not common and is likely the contributing factor for apical dysfunction in patients with this condition

Name: Arianna Kousari, MD

Presentation Type: Poster Presentation

Residency Program: University of Colorado

Additional Authors: Maria G. Frank, MD, Alison Hixon, PhD

Abstract Title: Pulmonary Hypertension, A Case of Severe Anemia

Abstract Information:

A 48-year-old female with no known prior medical history presented after a syncopal episode and was found to have a hemoglobin of 2.7 g/dL.

Case Description: A 48-year-old female with no known medical history presented after a syncopal episode and one week of malaise and fatigue. She was diagnosed with high output heart failure complicating severe pulmonary hypertension. Hemoglobin was 2.7 g/dL with MCV of 50 fL. She denied menorrhagia, melena, hematuria or hematemesis as well as weight loss or travel history. She reported a balanced diet without restrictions. Work-up was consistent with iron deficiency anemia and positive H. pylori stool antigen. Gastric parietal cell antibody titer was elevated at 40.6, but with normal gastrin level and negative intrinsic factor antibody. Pulmonary artery catheterization demonstrated severe pulmonary hypertension with high output heart failure physiology. Colonoscopy was unremarkable. Esophagogastroduodenoscopy was significant for atrophic gastric mucosa and presence of H. pylori on pathology. Remaining extensive workup was non-contributory. She received blood transfusions and intravenous iron with resolution of her symptoms. Her severe PH likely led to right heart failure with congestive hepatopathy in the setting of severe anemia with compensatory high output heart failure physiology. H. pylori treatment was continued at discharge and appropriate follow-up was arranged.

Discussion: Chronic hypoxia is a well-known cause of Pulmonary Hypertension (PH). Chronic anemia can lead to a hypoxic state leading to development of PH. Hypoxia triggers thickening of the medial layer of pulmonary vasculature via stimulation of fibroblast migration and subsequent differentiation into smooth muscle cells. Endothelial cells found in pulmonary vasculature can produce vasoconstrictive mediators and decrease the production of vasodilatory and anti-proliferative mediators such as nitric oxide. Additionally, in vitro studies suggest that hypoxia can induce proliferation of inflammatory mediators such as IL-6 from vascular smooth muscle cells. These combined mechanisms lead to increased pulmonary vascular resistance.

Iron deficiency and Iron Deficiency Anemia (IDA) have also been implicated in pulmonary arterial hypertension (PAH), and idiopathic PH. Dysregulation of iron homeostasis causes pulmonary vascular endothelial dysfunction via overexpression of endothelin 1 and suppression of nitric oxide. Hypoxic states induce hypoxia-inducible factors (HIFs) which are thought to play a role in hepcidin suppression. The pro-inflammatory cytokine IL-6 is induced by iron depletion and correlates with lower iron levels in patients with Pulmonary Arterial Hypertension (PAH) and Chronic Thromboembolic Pulmonary Hypertension (CTEPH). However, the exact mechanism between these cellular mediators, anemia, and development

of PH has not been fully elucidated.

We describe a case of severe anemia, in the setting of *H. pylori* infection, that led to development of PH. This case emphasizes the importance of routine primary care and age appropriate preventative and cancer screening. The patient did not have any routine care for the majority of her adult life. Her anemia would likely have been detected and treated during routine preventative screening, thereby preventing the above described complications.

Name: Rachel Kubowicz, MD

Presentation Type: Poster Presentation

Residency Program: Saint Joseph Hospital

Additional Authors: Aubrey Arensdorf, DO

Abstract Title: Cushioning the Differential

Abstract Information:

Introduction: Adrenocortical carcinoma (ACC) is a rare condition that can present with hormone excess.

Case:

54 year old female with past medical history of SLE and antiphospholipid antibody presented with a week of left groin pain and diarrhea who was diagnosed with perforated diverticulitis complicated by multiple intra-abdominal abscesses found to have multiple unusual subacute complaints.

She reported progressive weakness over six months preventing her from walking, standing, or even sitting upright, 20 lb weight gain over three months, and hair thinning. She was noted to have hirsutism and moon facies on exam. She also experienced new-onset vaginal bleeding five years post menopause while admitted.

CT abdomen pelvis revealed a 14 x 13 x 11.5 cm retroperitoneal mass as well as a 6mm right middle lobe pulmonary nodule. Contrast imaging revealed that the mass arose from the adrenal glands and also showed a thickened endometrial stripe. Concern for a malignant process causing cushingoid presentation prompted biopsy of a liver mass which confirmed her diagnosis of metastatic M1 stage IV ACC. She was found to have urine norepinephrine 73, serum cortisol 43, estradiol 65, and DHEAS 302. She had intact nuclear expression of MLH1, PMS2, MSH2, and MSH6 hence pembrolizumab ineffective.

She was transferred to the University of Colorado to discuss options with providers in their ACC program, however, after discussion opted for no further treatment. She was started on Metyrapone palliatively to treat her hypercortisolism and went home with home hospice.

Discussion:

ACC is a rare disease found in approximately 2 patients per million per year, usually in the 5th or 6th decade of life, and more commonly in females. Adrenal tumors, however, are common and seen in 3-10% of people. The majority of these are small, benign, non-functioning lesions. Clinicians need to recognize when a common finding is suspicious for a more serious condition.

ACC presents in 3 main ways. 40-60% of cases present with hormone excess; primarily hypercortisolism, androgen excess, or both concurrently. One third present with non-specific symptoms from tumor growth. The remaining patients are usually diagnosed after incidental findings on imaging.

Workup of adrenal incidentaloma should include evaluation for hormone secretion by both

physical exam, and biochemical studies to detect subclinical excess. Imaging studies are also crucial to distinguish between benign and malignant tumors. Typical features of malignancy such as size, heterogeneity, calcification, and invasion are assessed. Hounsfield Units and contrast washout timing can help characterize lesions.

This case also highlights the importance of the physical exam. Our patient had a dramatic change in her physical appearance in the months preceding her diagnosis. She had multiple telephone visits for symptoms, but was not seen in person, which may have prompted earlier workup, until her hospital presentation.

Name: Ayal Levi, MD
Presentation

Presentation Type: Poster

Residency Program: Saint Joseph Hospital

Additional Authors: Tavis Rinderle, DO

Abstract Title: A Cultured Discussion

Abstract Information:

Introduction:

Blood cultures are a staple of medical practice; viewed as relatively non-invasive, cheap, and reliable. They remain a common diagnostic tool in the emergency department, internal medicine floor, and intensive care unit. The clinical refrain of “culture if spikes” echoes during sign-out. Nevertheless, its true utility and complications remain unclear. In this abstract we present a review and analysis of blood culture data from a community hospital.

Methods:

Retrospective review of 608 patient charts from 2019. Evaluated initial indication for blood cultures per physician note, physical, vitals, and lab values. Blood culture results were grouped according to: vital sign, lab value, physical exam finding, a combination of the aforementioned, or SIRS/qSOFA.

Results:

13% of the blood cultures were positive. The most common principle diagnosis was sepsis due to E. coli, MSSA, MRSA, and unspecified organism. 44% of the blood cultures were for SIRS/qSOFA criteria, with 20% being positive. 26.1% were for two or more of the following; a vital sign, physical exam, lab, or imaging finding, with 10.1% being positive. 26% consisted of isolated findings within those same categories with 10.3% positive. 6.3% of findings were documented as infection screening with 2.3% turning positive.

Discussion:

In our review, we found that sepsis physiology was the greatest predictor of positive blood cultures. Isolated abnormalities were shown to be poor predictors. Our study resulted in higher positive blood culture results than the national average, suggesting an elevated false positive rate.

Physicians will continue to rely on blood cultures to guide the intensity and duration of treatment, which will have large impacts on hospital resource utilization. Based off of our data, blood cultures, despite their inherent “low-cost,” should not be considered standard part of every work-up. Instead, blood cultures are most likely to be positive when a patient displays sepsis physiology or has multiple laboratory/clinic indicators, i.e. “sick at the bedside.” Physicians should consider potential false-positives and subsequent impact on patient care.

The cost of a single blood culture at our institution totals \$56. With a 25% reduction in blood cultures there would be a reduction in cost totaling approximately \$80,000 annually. Given

that false positive cultures increase hospital length of stay, a 25% reduction would lead to annual savings of approximately \$1 million dollars. More importantly, it would save patients unnecessary medical treatment.

With our review, we identified several conditions that are likely to result in a positive test. This data, despite its limitations, would be useful in guiding clinical practice. Sepsis physiology or evident clinical illness should prompt blood culture collection. There are patient and cost savings associated with a reduction in blood culture utilization for other scenarios. Further research is needed to identify clinical guidelines for proper utilization."

Name: Shannon Lyons, DO

Presentation Type: Poster Presentation

Residency Program: Parkview Medical Center

Additional Authors: Ricki Kumar, DO, Bhavani Suryadevara, MD

Abstract Title: The Many Faces of COVID-19: An Atypical case of COVID-19

Abstract Information:

Introduction: The novel coronavirus disease 2019 (COVID-19) has affected more than 8,000,000 people worldwide with the number of cases and deaths surging in the US as of October 2020 per CDC report (1). Criteria to test is quickly evolving as its presentation is better understood; however, lack of adequate testing is still a limitation. While the most common presenting symptoms are fever (44- 98%), cough (46-82%), and dyspnea (20-64 %), there are less common symptoms such as diarrhea (10%) (3). Prior criteria for COVID-19 testing excluded those with positive respiratory viral panels; however, a study estimates that about 1 in 5 people infected with COVID-19 are coinfecting with another respiratory virus (4). As we embark upon “flu season” again, the decision to test for COVID-19 becomes even more nuanced. The following is a case of concomitant COVID-19 and rhino/enterovirus infection presenting predominantly as fever and diarrhea.

CASE REPORT

An 85-year-old male with a history of prostate cancer status post prostatectomy, urothelial carcinoma status post resection and chemoradiation presented with 5 days of ongoing watery, non-bloody diarrhea, decreased appetite, and subjective fever and chills. He reported nausea but denied vomiting, abdominal pain, recent travel, or antibiotic use. He had multiple exposures to family and friends as his wife died the prior week from a COVID-19 negative respiratory illness. He denied cough, congestion, dyspnea, chest pain. Initial labs revealed leukopenia with lymphopenia, thrombocytopenia, elevated CRP and LDH. The patient was also hypoxemic at 85% on room air and was started on supplemental oxygen. Chest x-ray (CXR) showed perihilar and bilateral lower lobe ground glass opacities (GGOs). Viral respiratory panel was positive for rhino/enterovirus and COVID-19 testing was positive. He was treated supportively and discharged within a few days in improved condition.

DISCUSSION

This case shows the importance of maintaining a low threshold to test for COVID-19 even in the presence of a positive viral respiratory panel and/or absence of upper respiratory symptoms. Lymphopenia is non-specific however noted in up to 50-60% of patients with COVID-19 (3,6), as can elevations in CRP and LDH. The most common findings on chest X-ray (CXR) are consolidation (47%) and GGOs (33%). CXR abnormalities were more likely peripheral (41%), bilateral (50%), and have lower lobe predominance (50%) (5). As cold and flu season comes back and cases of COVID-19 are again on the rise, access to testing becomes even more difficult.

CONCLUSION

This patient constitutes an atypical presentation of COVID-19 given primary presenting

symptom of diarrhea and coinfection with rhino/enterovirus, which challenges prior belief that coinfection should not be tested. With our understanding of COVID-19 rapidly evolving, we can expect to see more changes in screening criteria due to atypical presentations such as this case.

Name: Michael Marll MD

Presentation Type: Poster Presentation

Residency Program: University of Colorado

Additional Authors: Amanda Johnson, MD, Elizabeth Breitbach, MD

Abstract Title: Saddle Nose Deformity As A Clue To An Underlying Vasculitis

Abstract Information:

Introduction: Granulomatosis polyangiitis (GPA) is a necrotizing small-to-medium vessel vasculitis with an estimated incidence of 3 cases per one million people in the United States. Predominantly affecting adults between the ages of 64 to 75, GPA typically presents with a triad of upper and lower respiratory tract disease (e.g. sinusitis, lung nodules, alveolar hemorrhage), systemic vasculitis, and glomerulonephritis. We present a case of GPA in a man with refractory chronic sinusitis and acute development of a saddle nose deformity.

Case Description:

67 year-old man with a past medical history significant for coronary artery disease who presents with 5 months of progressive sinusitis refractory to antibiotic therapy. Three weeks prior to hospitalization, the patient underwent nasal endoscopy with biopsies revealing acute on chronic sinusitis with associated necrosis. Two weeks following this procedure, he developed progressive collapse of the nasal bridge. Further history notable for malaise, weight loss, cough, dyspnea, and night sweats over the preceding five months. Upon hospitalization, a CT Chest with IV Contrast showed a 5.2cm right lower lobe cavitory lung lesion. Bronchoscopy then uncovered diffuse and severe inflammation of the large airways with purulence and transbronchial biopsies of the right lower lobe cavitation showed squamous metaplasia and mixed acute and chronic inflammation with rare giant cells. Bronchoalveolar lavage was ultimately negative for infection and malignancy. Pulmonary tuberculosis was ruled out with AFB smears/cultures prompting a serologic evaluation significant for elevated inflammatory markers and positive cANCA (1:80)/PR3 antibodies. These clinical findings and serologies are consistent with granulomatosis polyangiitis causing necrotizing sinusitis with saddle nose deformity and a cavitory lung lesion. This patient did not have active renal involvement or other signs of systemic vasculitis at the time of diagnosis.

Discussion:

GPA is a fatal disease with the average life expectancy for patients not receiving treatment spanning only five months. For internists, sinusitis is one of the most reported chief complaints by patients presenting in an ambulatory clinic. Therefore, a thorough history and exam in these patients is essential to identify those with less common causes of sinusitis. Key findings to suggest a systemic pathology such as GPA in the setting of sinusitis includes associated fevers, bloody discharge, nasal septal perforation or crusting, and nasal bridge collapse. Given the high mortality rate associated with GPA, this case emphasizes its insidious nature and the importance of pursuing an expedited work-up in a patient with sinusitis refractory to empiric therapies.

Name: Marissa A. Martin, MD **Presentation Type:** Poster Presentation

Residency Program: University of Colorado

Additional Authors: Michael H. Lee, MD, Anna Neumeier, MD, Tristan J. Hule, MD

Abstract Title: A case of bilious ascites and abdominal compartment syndrome from pancreatitis-induced post-Roux-en-Y gastric remnant leak

Abstract Information:

Introduction:

Post-surgical leaks complicate up to 7% of Roux-en-Y gastric bypass procedures and they result in greater than 50% morbidity and mortality. Most leaks occur at the gastrojejunal anastomosis, and on average, they become symptomatic three days after surgery. While rare, leaks can also occur from the gastric remnant and can have delayed presentations.

Case Description: A 55-year-old man with a past medical history of atrial fibrillation, previous alcohol-induced acute pancreatitis, and Roux-en-Y gastric bypass surgery 15 years prior presented with acute pancreatitis. He quickly decompensated, developing distributive shock, bacteremia, acute respiratory distress syndrome, anuric acute renal failure, and was also noted to have a distended abdomen with increasing ascitic fluid on imaging. An elevated bladder pressure, lactic acidosis, and anuria raised concern for abdominal compartment syndrome. Paracentesis was done and four liters of bilious ascitic fluid were drained. Using the manometer from a lumbar puncture kit, intra-abdominal pressure was measured and improved from 27 cmH₂O to 13 cmH₂O with paracentesis. Mean arterial pressure and urine output also improved. Analysis of the ascitic fluid showed significantly elevated total bilirubin, lactate dehydrogenase, and amylase. Unfortunately, the patient developed recurrent loculated intra-abdominal fluid collections and leukocytosis, which raised the suspicion for biliary perforation or a post-Roux-en-Y leak, though multiple imaging studies including ultrasound, CT scans with and without contrast, MRCP, ERCP, upper GI fluoroscopy, and small bowel enteroscopy failed to reveal a source of the bilious output. Ultimately, a gastrostomy tube was placed and delivery of contrast material through the tube revealed an active extravasation from the remnant stomach. The patient was eventually discharged home with one remaining intra-abdominal drain in addition to the gastric tube to allow for gastric decompression and spontaneous healing of the post-Roux-en-Y leak.

Discussion: This case underscores the importance of considering post-surgical leak as a diagnostic possibility regardless of how remotely a Roux-en-Y surgery took place. It also

confirms the importance of pursuing early gastrostomy tube placement and contrast administration when post-Roux-en-Y gastric remnant leaks are suspected in order to allow for definitive diagnosis and appropriate treatment. Lastly, it demonstrates a diagnostic as well as therapeutic role of paracentesis in critically ill patients with abdominal compartment syndrome.

Name: G. Logan McCracken, MD **Presentation Type:** Poster Presentation

Residency Program: University of Colorado

Additional Authors: Manuel Urra, MD

Abstract Title: An Immune System Unleashed: Cytokine Release Syndrome following Immune Checkpoint Inhibitor Therapy

Abstract Information:

Introduction: Immune checkpoint inhibitors have revolutionized treatment in melanoma and are increasingly being used in other malignancies. As more patients are being treated with these immunotherapies, it is important for internists to recognize potential adverse reactions. While they are typically well tolerated, they do carry a risk of multiple adverse effects related to activation of the immune system. These are usually delayed autoimmune reactions. However, a rare possibility of immune checkpoint inhibition is Cytokine Release Syndrome (CRS), which can be a difficult diagnosis to make as was evident in this case.

Case Description: A 71-year-old female with past medical history of metastatic melanoma with known brain metastases presented with confusion and concerns for seizure activity the day after receiving ipilimumab and nivolumab infusions. She was found to be markedly febrile, hypotensive, and profoundly hypoxic with oxygen saturation of 66% on room air. The patient was managed with vasopressor support and heated high flow nasal canula at 90% FiO₂. She was admitted to the intensive care unit on arrival to our facility. Admission labs were notable for leukocytosis of 15 and chest X-ray showing an infiltrate concerning for a post-obstructive pneumonia. Given her presentation consistent with septic shock, the patient was started on broad-spectrum antibiotics. She continued to require vasopressor support and her respiratory status failed to improve. Upon consultation with oncology, a concern was raised for CRS. A C-reactive protein resulted at 180 mg/L. The patient was started on Dexamethasone and Tocilizumab (IL-6 inhibitor) while an IL-6 level was obtained. Over the following days, the patient's oxygen requirements gradually improved, and the IL-6 level returned markedly elevated to 64 pg/mL (reference range <5).

Discussion: CRS is a well-known phenomenon and occurs in several different categories of immunotherapy, most commonly in CAR-T cell therapy. While it has been reported following immune checkpoint inhibitor therapy, it is a relatively rare occurrence. The primary difficulty in recognizing and diagnosing CRS is in distinguishing it from septic shock and other potential underlying causes. This is especially difficult as patients with malignancy who are receiving treatment are at risk for infections, thrombosis, and worsening malignancy, which present similarly. A diagnosis of CRS requires the presence of fever, but otherwise symptoms can be variable. In severe cases, it can manifest as acute hypoxic respiratory failure, shock, and multiorgan system failure. A markedly elevated IL-6 does support the diagnosis of CRS in an

appropriate clinical scenario. Just as it is important to consider infection in patients on chemotherapy, it is important to have a high index of suspicion for CRS and other autoimmune reactions in patients receiving immunotherapy.

Name: Anita Moudgal, MD

Presentation Type: Poster Presentation

Residency Program: University of Colorado

Additional Authors: Michelle Pengshung, MD, Pedro Giro, MD, Andrew Berry, MD

Abstract Title: Take your vitamins! A case-report of Vitamin B12 deficiency resulting in psuedo-thrombotic microangiopathy

Abstract Information:

Introduction:

Vitamin B12 deficiency has a variety of clinical manifestations, common and uncommon. Here we present a case of psuedo-thrombotic microangiopathy as a rare manifestation of severe vitamin B12 deficiency.

Case Description:

A 70-year-old male with a history of right hemicolectomy presented with fatigue, poor appetite, and a thirty-pound (13 kg) weight loss over the course of three months. Vitals signs were normal. Exam was remarkable for pale conjunctiva, scleral icterus, and jaundice. Neurological exam was normal. Labs were notable for pancytopenia with hemoglobin 5.7 g/dL, MCV 109 fL, WBC 4000/uL, and platelets 60,000/uL. In addition, he had elevated LDH 6215 U/L, low haptoglobin <10 mg/dL, low reticulocyte index 0.27, and normal creatinine. Peripheral smear exhibited hypersegmented neutrophils, increased schistocytes, and a left shift with rare blasts. His work-up suggested intravascular hemolysis and bone marrow underproduction. Additional work-up revealed a low vitamin B12 level of 73 L pg/mL and elevated intrinsic factor antibodies.

Severe vitamin B12 deficiency was diagnosed. This patient had an unfortunate combination of prior right hemicolectomy impairing absorption of B12 and elevated intrinsic factor antibodies suggestive of pernicious anemia. He underwent aggressive vitamin B12 repletion via intramuscular injections. Two-week follow-up showed drastic improvement in his severe pancytopenia and his vitamin B12 levels improved.

Discussion:

The most common causes of Vitamin B12 deficiency include pernicious anemia, malabsorption, and restrictive diets (vegan/vegetarian). Vitamin B12 has a significant role in DNA synthesis important for hematopoiesis and myelination of the central nervous system.⁸ Vitamin B12 deficiency most often presents as a macrocytic anemia. It can rarely present with pancytopenia, which may be concerning for a malignancy. Additionally, it can cause intramedullary and extramedullary hemolysis. When B12 deficiency presents with intravascular hemolysis, it can mimic life-threatening primary thrombotic microangiopathy (TMA) syndrome and has been

termed pseudo-TMA given its similarities. Pseudo-TMA is rare and in one study examining 201 patients with known vitamin B12 deficiency, it was found in only 2.5% of patients.² Unlike primary TMA which is caused by vascular lesions and microvascular thrombosis, pseudo-TMA is thought to be multifactorial from decreased cytoskeletal deformability and hyperhomocysteinemia causing endothelial dysfunction.^{3,8}

Primary TMA syndrome can be life threatening and may need emergent management. It is typically associated with a larger reticulocyte count compared to pseudo-TMA. This was reassuring in our patient given his low reticulocyte index. Other significant differences found in pseudo-TMA but not primary TMA include macrocytosis, leukopenia, and significantly higher LDH due to intramedullary hemolysis in the setting of ineffective erythropoiesis. Additionally, our patient did not have evidence of renal dysfunction, neurological changes or significant number of schistocytes, which pointed away from a primary TMA syndrome. Our patient's labs improved with vitamin B12 repletion with a most recent hemoglobin of 14.6 g/dL.

Name: Patrick Pamintuan, DO **Presentation Type:** Poster Presentation

Residency Program: Parkview Medical Center

Additional Authors: Neil Patel, Md, Teresa Braden, DO, FACP, Jatinbhai Patel, MD

Abstract Title: Microbial Mutiny: Multi System Organ Infection Secondary to Streptococcus anginosus

Abstract Information:

The Streptococcus anginosus group, also referred to as the Streptococcus milleri group, are common constituents of the oropharyngeal, gastrointestinal, and genitourinary systems. If given the chance, they can become pathogenic with a demonstrated propensity for abscess formation in distant sites. We present the case of a patient with a medical history significant for sarcoidosis on chronic steroids who presented with 4 weeks of dyspnea, cough, and pleuritic chest pain and was found on imaging to have infectious abscess formation of multiple organ systems in the setting of another multisystem disorder.

A 63-year-old African-American man with history of sarcoidosis on chronic daily prednisone, presented to an outside hospital with increasing dyspnea, cough, and pleuritic chest pain occurring for 4 weeks. He was hypoxic on presentation but denied all other associated symptoms. He was noted to have multiple skin abscesses and large left lower lobe consolidation and pleural effusion on CXR. Social history was negative for intravenous drug abuse. Thoracentesis was performed and fluid studies appeared infectious and culture eventually returned positive for Streptococcus anginosus. The patient was subsequently diagnosed with empyema and started on appropriate antibiotic therapy. Cardiothoracic surgery was consulted for video assisted thoracoscopic surgery (VATS) due to the extensive nature of the empyema. During surgery it was noted that infection had invaded into the pericardial space necessitating pericardial window. Incision and debridement of skin abscesses yielded cultures that again showed Streptococcus anginosus. Neurosurgery was also consulted as thoracic and lumbar MRIs taken after his cardiothoracic procedure showed concern for discitis and osteomyelitis with compression fractures of the L2 and L3 vertebra for which patient underwent decompression, fusion, and fixations performed, and eventual repeat decompression for a retropulsion of L2.

The patient continued to recover from his multiple operative procedures with removal of chest tubes and pericardial window and eventual transition to an inpatient rehabilitation facility where he completed 6 weeks of antibacterial therapy.

This case presents a patient with extensive and disseminated Streptococcus anginosus infection

complicated by multi organ disorder secondary to sarcoidosis with associated immunosuppression by way of chronic prednisone therapy. In immunocompetent individuals this group of bacteria can be found in oral, gastrointestinal, and genitourinary systems with no pathological significance. Importance is cast on the destructive effect common body flora can have as well as the effectiveness of a multidisciplinary approach when faced with a severely immunocompromised patient.

Name: Neil Patel, MD

Presentation Type: Poster Presentation

Residency Program: Parkview Medical Center

Additional Authors: William Grigg, DO, Teresa Braden, MD, FACP

Abstract Title: The largest described case of Pilomatrix Carcinoma

Abstract Information:

Pilomatrix Carcinoma is an extremely rare malignant variant of pilomatrixoma. It stems from the abnormal proliferation of matrical cells in developing hair. Classically described as a painless, violaceous mass with an overlying ulcer on the head and neck region, we describe a case of a 65-year-old female with a pilomatrix carcinoma on the right neck 12 x 11 cm in size. Germinative matrix cells proliferate and eventually mature and keratinize into the hair shaft normally. In this neoplasm, the matriceal cells proliferate abherrently. These tumors recur commonly despite wide margin excisions. Metastasis is a potential complication and has been described in other case reports.

The prevalence of this cancer is exceedingly rare. Only 135 cases have been reported worldwide bimodally distributed, presenting in the third decade of life or sixth to seventh decades. More than half of patients are in the head and neck region, with males being more predominant. Our case is a female in her 60's with limited medical contact and previous use of only naturopathic medicine, making her case more unique.

Clinically, most cases are painless firm masses with a violaceous overlying ulcer ranging in size from 0.5 to 4 cm. Our patient mass was 11 x 12 cm, making it the largest tumor of its kind ever described.

Pathologically, Immunohistochemistry is typically significant for beta-catenin, LEF1, B-cell lymphoma 2 (Bcl-2), Bcl-2-associated X protein (BAX), and the cluster of differentiation (CD)44. Treatment is excision with wide margins, but 50 to 83 % of cases recur, and up to 16% of cases can metastasize. In cases where excision was not possible, radiotherapy was effective with no progression of the disease. Chemotherapy has been reported as ineffective. In our case, the patient underwent wide excision with clean margins noted on pathology, and the patient was informed to follow up with General Surgery as well with Hematology and Oncology for yearly follow-ups.

Name: Emma Schlager, MD

Presentation Type: Poster Presentation

Residency Program: Saint Joseph Hospital

Additional Authors:

Abstract Title: Kratom Eye Wobbles: Oscillopsia and horizontal nystagmus in a patient with kratom toxicity

Abstract Information:

Introduction:

Kratom is an herb extracted from the leaves of the *Mitragyna speciosa* tree, native to Southeast Asia. 1,2 Although illegal in many countries, it remains widely available in the United States. Kratom is used for the treatment of opioid withdrawal, treatment of chronic pain, and for recreation. 1,3 The two active alkaloids, mitragynine and 7-hydroxy-mitragynine, have agonist activity at mu and kappa opioid, postsynaptic alpha-2 adrenergic, and serotonin receptors, amongst others. 1,2 The adverse effects of kratom include dry mouth, agitation, nausea, vomiting, constipation, confusion, hallucinations, and respiratory depression. 3,4 Although not commonly reported in medical literature, kratom can cause nystagmus, 3 known in colloquial terms as the “kratom eye wobbles”. Here I present a case of a woman presenting with presyncope, vision changes, and horizontal nystagmus, who had toxic levels of kratom in her urine.

Case:

A 51 year old female patient with a history of intravenous heroin abuse presented after a presyncopal episode at her primary care clinic. The patient described "wavy" vision and oscillopsia. On exam, she had bilateral horizontal nystagmus. The workup was comprehensive and unrevealing, and included orthostatic vital signs, vitamin B12/folate levels, EKG, TTE, chest x-ray, and brain MRI. On further discussion, the patient admitted she had been using kratom to treat her opioid cravings. Her urine mitragynine level was greater than 500 ng/mL. Her visual symptoms resolved over the next few days, but she required treatment for symptoms of opioid withdrawal prior to discharge.

Discussion:

The accessibility of kratom and its ability to cause death from respiratory depression makes it important for healthcare providers to recognize signs of kratom toxicity and to screen for non-prescription herbal supplement use. 1,5 Interestingly, nystagmus as a sign of kratom toxicity is

rarely reported in the medical literature⁶; however, a Google search of “kratom nystagmus” yields a myriad of anecdotal reports of kratom users experiencing “the eye wobbles”.

Conclusion:

Healthcare providers should be aware that visual changes and nystagmus can be important diagnostic clues into kratom toxicity. This case highlights the value of obtaining a comprehensive history of herbal supplement usage.

References:

1. Sanderson M, Rowe A. Kratom. *CMAJ*. 2019;191(40):E1105. doi:10.1503/cmaj.190470
2. Warner ML, Kaufman NC, Grundmann O. The pharmacology and toxicology of kratom: from traditional herb to drug of abuse. *Int J Legal Med*. 2016;130(1):127-138. doi:10.1007/s00414-015-1279-y
3. Nelsen JL, Lapoint J, Hodgman MJ, Aldous KM. Seizure and coma following Kratom (*Mitragynina speciosa* Korth) exposure. *J Med Toxicol*. 2010;6(4):424-426. doi:10.1007/s13181-010-0079-5
4. Eggleston W, Stoppacher R, Suen K, Marraffa JM, Nelson LS. Kratom Use and Toxicities in the United States. *Pharmacotherapy*. 2019;39(7):775-777. doi:10.1002/phar.2280
5. Kuehn B. Kratom-Related Deaths. *JAMA*. 2019;321(20):1966. doi:10.1001/jama.2019.6339
6. Babu KM, McCurdy CR, Boyer EW. Opioid receptors and legal highs: *Salvia divinorum* and Kratom. *Clin Toxicol (Phila)*. 2008;46(2):146-152. doi:10.1080/15563650701241795

Name: John Stacy, MD

Presentation Type: Poster Presentation

Residency Program: University of Colorado

Additional Authors: Natalie Longino, MD, PhD, Jennifer Doran, MD, Jeffrey Spence, MD, Noelle Northcutt, MD

Abstract Title: Cardiac amyloidosis with a cherry on top

Introduction:

This is a case of an initially missed diagnosis of cardiac amyloid (CA) that highlights the importance in determining the underlying etiology of heart failure in order to guide appropriate medical therapy.

Case description:

A 66-year-old African American male with a history of chronic obstructive pulmonary disease (COPD) on 2 liters of oxygen at baseline, left ventricular hypertrophy (LVH), heart failure with preserved ejection fraction (HFpEF) status-post cardiac resynchronization therapy for prior heart failure with reduced ejection fraction (HFrEF) and chronic kidney disease stage III (baseline creatinine 1.9) was admitted for failure to thrive. During his hospitalization, the patient developed an increasing oxygen requirement to 6 liters and an acute kidney injury concerning for pulmonary edema and cardiorenal syndrome secondary to decompensated HFpEF. Diuresis was initiated with no improvement of respiratory status and worsening renal function, with serum creatinine peaking at 3.14. His oxygen requirement remained elevated but stable and his volume exam remained equivocal. Due to degree of LVH, a formal echocardiogram was obtained that again showed severe left ventricular hypertrophy and a left ventricular strain pattern sparing the apex concerning for CA. Serum light chain studies showed an elevated kappa level (31 mg/dl) and an elevated kappa:lambda ratio (2.54). Collectively, these findings are consistent with a diagnosis of light chain amyloidosis (AL), though definitive diagnostic studies including a pyrophosphate SPECT scan, cardiac biopsy and fat pad biopsy would be needed to differentiate AL from transthyretin amyloidosis (ATTR). These studies were deferred given the patient's cognitive status and overall goals of care. Diuresis, beta blockade and ACE inhibition was discontinued, and the patient's creatinine returned to baseline.

Discussion:

Cardiac amyloidosis typically presents with intermittent heart failure exacerbations, predominantly in African American individuals with HFpEF. Notably, the characteristic left ventricular strain pattern with apical sparing described above, otherwise known as the "cherry

on top,” is 93% sensitive and 82% specific for CA. Despite its perceived rarity, amyloidosis is a relatively common cause of HFpEF, especially in certain demographics. Up to 30% of HFpEF hospitalizations in those >75 may be due to ATTR amyloidosis, and the prevalence in African Americans is 3-4 times that in Caucasians. Identification of CA as the etiology of heart failure is important because typical heart failure management with beta-blockade, ACE inhibitors and diuresis can cause harm as demonstrated by the kidney injury illustrated in our case. Finally, improvements in treatment of both AL amyloidosis and ATTR amyloidosis mean that cardiac involvement does not carry as poor a prognosis as it once did. These treatments are more effective the earlier they are implemented, underlining the importance of early diagnosis and the utility of keeping amyloidosis on the differential when managing patients with HFpEF.

Name: Adam Starr, MD

Presentation Type: Poster Presentation

Residency Program: University of Colorado

Additional Authors: Catherine Callister, MD

Abstract Title: A 64-year-old man with isolated orthopnea

Abstract Information:

Introduction/ Case Description:

A 64-year-old man with hypertension presented to the emergency department with a one-week history of sudden onset dyspnea occurring only when laying supine. He denied chest pain and had no history of congestive heart failure. He had been discharged from a hospital two days prior, where an extensive work-up was performed. A chest radiograph was unrevealing. A CT chest angiogram was negative for acute findings including pulmonary embolism. A transthoracic echocardiogram demonstrated normal left ventricular ejection fraction (LVEF), no diastolic dysfunction, and no other significant findings. The patient was discharged with an empiric course of antibiotics for presumed pneumonia. He re-presented two days later due to persistent symptoms.

Physical examination revealed an obese man in no acute respiratory distress when upright. However, upon laying supine, the patient became markedly anxious with immediate use of accessory muscles of respiration. Pulse oximetry demonstrated normal SpO₂ while upright, but mild hypoxia while supine. Routine laboratory examination was unremarkable. TSH, CK, and HbA_{1c} were normal. A chest radiograph demonstrated low lung volumes but no other acute findings. An empiric dose of IV furosemide achieved expected diuretic response but no improvement in orthopnea. Repeat transthoracic echocardiogram confirmed normal LVEF and no evidence of diastolic dysfunction.

A negative inspiratory force test was markedly low at 15 cmH₂O. A fluoroscopic sniff test revealed complete absence of contraction of either hemidiaphragm. A diagnosis of bilateral diaphragmatic paralysis was made. Follow-up testing, including serum aldolase, myositis/neuromuscular disorders antibody panel, and genetic testing for neuromuscular disorders, was unrevealing. Subsequent EMG/NCS of the extremities was negative, indicating a disorder isolated to the diaphragm and its innervation rather than a diffuse process. The patient was discharged home on bilevel positive airway pressure to be used while supine. At 9 months, the patient remained without diaphragmatic function and was under consideration for surgical implantation of diaphragmatic pacing electrodes. A definitive etiology was never identified, however, a post-viral neuropathy was suspected.

Discussion:

This case illustrates orthopnea, a common clinical finding, here due to a rare clinical syndrome. Isolated bilateral diaphragmatic paralysis is uncommon. Etiologies include motor neuron disease, neuromuscular junction disease, neuropathies, and inflammatory myopathies. Treatment involves management of the underlying etiology and supportive care, such as positive pressure ventilation, and in rare cases, surgical implantation of diaphragmatic pacing electrodes.

Name: Benjamin Staum, MD
Presentation

Presentation Type: Poster

Residency Program: University of Colorado

Additional Authors: Juan Lessing, MD, FACP, Deepa Ramadurai, MD

Abstract Title: Overuse Phlebotomy and Impact on Organ Transplant

Abstract Information:

Introduction:

Hospitalized patients undergo frequent blood draws. Phlebotomy overuse results in a common phenomenon: hospital-acquired anemia (HAA). In a study by Salisbury et al of over 17,000 patients hospitalized with acute myocardial infarction, 20% of patients not anemic on admission developed anemia while hospitalized. HAA results in changes to care, often leading to otherwise unnecessary blood transfusions and potential negative downstream effects.

Case Description:

A woman in her 20s with no medical history presented to the emergency department with several days of chest tightness and dyspnea. Diagnosed with myocarditis, she developed cardiogenic shock requiring mechanical circulatory support. Her course was complicated by thoracic bleeding requiring surgery and numerous blood product transfusions. Once stable, she was listed for heart transplant. On hospital day 48, she developed methicillin-sensitive *Staphylococcus aureus* (MSSA) bacteremia. Vancomycin and cefepime were initiated and daily blood cultures were drawn to assess for bacteremia clearance. Ten sets of blood cultures were drawn over one week, resulting in anemia and three additional blood transfusions.

Discussion:

The successful search and workup for compatible organ transplant is complex. One critical aspect involves tissue typing, which identifies specific blood antigens called human leukocyte antigens (HLA). The more compatible the HLA match, the better the odds of successful transplant. HLAs are inherited from each parent, but exposure to other HLAs via blood can occur during pregnancy, organ transplants, and blood transfusions. These exposures can cause sensitization, which limits the potential donor pool. As such, attempts are made to limit blood

transfusions and thereby limit potential sensitization. For our patient, the initial need for transfusions in the setting of profuse bleeding outweighed the risk of sensitization. However, once she became bacteremic and deactivated from the transplant list, orders were placed for two blood cultures daily until clearance was documented. Clearance was necessary in order to re-activate the patient on the transplant list, so aggressive blood testing seemed reasonable at the time. However, this resulted in an iatrogenic, severe anemia requiring multiple and avoidable transfusions, increasing the risk of sensitization.

When considering patients with bacteremia, appropriate blood culture utilization should be carefully considered. The Infectious Diseases Society of America recommends repeat cultures in the setting of MSSA bacteremia 2-4 days after the initial positive culture, not daily. Overuse can lead to increased patient complications (HAA) and hospital system costs (microbiology lab burden) without benefit. Thoughtful use of laboratory studies, including blood culture frequency, can reduce harm and improve benefit.

Name: Richard Stephens, DO

Presentation Type: Poster Presentation

Residency Program: Saint Joseph Hospital

Additional Authors: Matt Applegate, MD

Abstract Title: MRI Exposing Catatonia

Abstract Information:

Introduction

Altered mental status (AMS) is a common presentation with a large differential. Catatonia is an uncommon cause of AMS that is important to distinguish from common central nervous system, toxic, or metabolic causes. Treatment for Catatonia is distinct from other syndromes and if left untreated, can have fatal consequences.

Case Presentation

A 63-year-old female with a history of alcohol use disorder, dementia, chronic pain, recent ischemic stroke, and depression presented for AMS. At baseline, she had residual weakness, ambulated with assistance, and verbalized her needs. In the days before admission, she was unable to follow commands, responded with yes or no responses, and became physically dependent on caregivers for her needs.

On admission, she is alert to self, does not respond appropriately to other questions, and echolalia is noted. Cranial nerves appear intact though difficulty assessing cranial nerves I, V, and VIII. Strength is intact but difficult to formally assess as she does not follow commands, she does use both arms and legs equally to reposition in bed without difficulty. CT head demonstrated no ischemic findings. Serotonergic medications were held with no clinical improvement. An EEG found diffuse slowing with no seizure activity.

MRI could not be performed due to agitation. A second attempt was made using lorazepam for sedation. Minutes after administration, she was alert, oriented to self, month, year, conversant but agitated and confused. Given her improvement with benzodiazepines, catatonia was suspected, scheduled lorazepam was ordered and within 48 hours she was conversing, aware of events prior to and during admission. Her aphasia improved, lorazepam dosing increased, and she returned to baseline function.

Discussion

Catatonia is characterized by motor dysregulation caused by multitudes of illness'; notably in

the context of underlying psychiatric or general medical illness. The three types of catatonia include akinetic, malignant, and excited. Most importantly, emphasis is placed on identifying the key characteristics such as immobility, mutism, posturing, echolalia, echopraxia, staring, and stupor. With time, it was discovered that the treatment of catatonia was accomplished with benzodiazepines, or electroconvulsive therapy in resistant cases and malignant catatonia.

Catatonia is often confused with conditions like neuroleptic malignant syndrome, encephalopathy, stroke, malignant hyperthermia, nonconvulsive seizures, and many others. Additionally, failure to recognize and treat catatonia can lead to a fatal outcome. This case illustrates the difficulty and importance of early diagnosis of Catatonia in patients with underlying medical or psychological conditions.

Summary

This patient fell under the diagnostic disguise of stroke and seizure. If not for the agitation during MRI that required treatment with benzodiazepine, the appropriate treatment would have been delayed. Although not a common cause of AMS, catatonia should be included in the differential of patients with atypical AMS so treatment can be initiated promptly.